S O I L C O N S E R V A T I O N D I G E S T

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U.S. D E P A R T M E N T O F A G R I C U L T U R E

SOIL CONSERVATION SERVICE

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CALIFORNIA-NEVADA

SOIL CONSERVATION ASSOCIATIONS

Directors of several Soil Conservation Associations have willingly given their time to promoting the work of the Soil Conservation Service in their districts. Others are willing but lack the time to devote to this work. Still others would do more if it were pointed out to them just how they might be of assistance.

Broad Powers

The Articles of Association which have been signed by the members give very broad powers to the directors. The Soil Conservation Service has already indicated that it wishes to receive all requests for surveys through the Association directors. It also wishes to have the counsel and advice of the directors in the program being carried forward.

Visit Projects

Directors are invited to contact the camp or project superintendent and to arrange to go with him to view all the work that has been completed or that is under way. They may also go over the proposed plans for future work. If any suggestions are offered by the directors the representatives of the Soil Conservation Service will give them full consideration.

Assist Members

If the directors believe that more work is required on properties that are listed as completed, or if they believe that there are better ways of accomplishing full erosion control, they should feel it their duty to reach an agreement among themselves and to present their ideas to the Service.

Attend Meetings

A representative of the Service will arrange to be present at the monthly meeting of the directors. He will not be there to run the meeting nor to entertain the directors, but will be present for the purpose of assisting in developing and carrying out a thorough erosion control program. His familiarity with other projects and with the general policies of the Service should enable him to benefit the association meetings. The directors, however, should indicate to him the part they wish him to take in their deliberations. He will gladly receive suggestions and arrange for their being given consideration.

All working toward a common cause will result in better understanding and more effective accomplishment.

FIELD WORK COMPLETED

Cooperators in the eleven Soil Conservation project areas in California and Nevada are familiar with the work that has been accomplished on their own properties and those of their neighbors. It is hardly expected, however, that they will have any idea of the vast amount of work that has been completed since the erosion control work was started in this region in 1934.

Greater progress is now possible as improved methods and improved machinery are being used. More work is accomplished by men who have gained experience. The fight against erosion losses is being pushed on eleven fronts, and the figures below indicate the accomplishments to date:

		CALIFORNIA	NEVADA
Terraces Constructed	Miles	134	315
Permanent Terrace Outlets Constructed	No.	1090	
Temporary Terrace Outlets Constructed	No.	1	
Terrace Outlets Seeded and Sodded	Sq. Yds.	276535	
Terrace Outlets Channels Completed	Lin. Ft.	83673	
Temporary Dams Constructed in Gullies	No.	7	1218
Permanent Dams Constructed in Gullies	No.	945	
Bank Sloping Gully Control	Sq. Yds.	56026	
Area Drained by Controlled Gullies	Acres	7190	35148
Water Spreading Dykes	Lin. Ft.	1500	5369
Diversion Ditches:			
Gully Control	Lin. Ft.	102979	
Area Planting:			
Forestation	Acres	1238	
Gully Planting	Acres	406	
Seed Collections:			
Tree and Shrub	Lbs.	17489	
Grass	Lbs.	2180	
Area Under Forest Management	Acres	533	

COVER CONTROLS EROSION

"Tests by the Soil Conservation Service and other branches of the Department of Agriculture show that land covered with forest trees and brush is least likely to wash. Good native grass sod ranks second in controlling soil washing. And alfalfa and other close-growing plants rank third in keeping soil from washing."

ARTISTIC PHOTOGRAPHS DESIRED

Some ten thousand record photographs illustrating practically every type of control practice are on file in Washington. The photographic department is now turning it's attention to making artistic photographs of pleasing composition which at the same time tell the Soil Conservation story.

Such pictures find ready publication in newspapers and magazines throughout the country and have a far-reaching effect in educating the public to a true understanding of the problems of the Service.

Opportunities for such pictures are few but do occasionally present themselves on all projects. It will be greatly appreciated if field men will keep this in mind and will note possible pictures of unusual value from an artistic as well as a Soil Conservation standpoint.

If a picture is likely to be available only for a short time due to conditions of weather, notify the Regional Photographer by wire at Santa Paula and a photographer will be sent to the area in advance of a regularly scheduled trip.

SUDAN GRASS FOR CONTROL OF WIND EROSION

Sudan grass has been found to be very effective in controlling wind erosion on the berms of Gradoni terraces on the Aliso Creek Project area. The seed is broadcast and harrowed in. Several seedings made after the rains have established a good cover with very little moisture. Although the location of these seedings would make difficult the cutting of hay, the forage could be pastured off after the beans have been harvested in the surrounding fields.

SOIL MOISTURE INVESTIGATIONS
Placerville Area

By J. H. Nelson, Soils Division

Erosion Causes

Erosion in the orchards of the Placerville area is due first to irrigation water run down furrows on steep slopes; second, concentration of water in these furrows during the rainy season; third, the lack of cover crops; and fourth, the relatively high susceptibility of many of the soils to erosion. There is also wastage of an already limited supply of water at the ends of the irrigation furrows, and percolation losses occur in many of the soils as a result of long irrigation runs.

Water Conservation

While erosion is a major problem in this area, water conservation is also important. Full use of available water and the prevention of water losses may make possible the growing of permanent cover crops.

Two general methods have been developed in this area by the growers--clean-cultivation and permanent cover crops. Some growers believe that sufficient water is available to support both a permanent cover crop and the orchard. Others question whether there is sufficient water available to support both a cover crop and an orchard. It is generally recognized that as much as 20 or 30% of the water turned into lateral ditches never reaches the orchard. Some of these ditches are a mile or more in length and seepage losses are great.

It appears that the additional water, if any, required for permanent cover crops may be more than offset by a saving of water in eliminating percolation and other losses resulting from the present irrigation methods.

Plan of Study

In working out a plan for a coordinated study the advice and counsel of interested Divisions in the California Agricultural Experiment Station was sought and obtained. As a result the engineering, agronomy, and soils divisions will endeavor to obtain answers to the following questions:

(1) Is there sufficient water available to support both a permanent cover crop and an orchard, irrespective of the method of applying irrigation water?

(2) Which methods are most effective in the application of irrigation water in this area?

(3) What is the most desirable cover crop from the standpoint of erosion control, water utilization, rodent control, and the harboring of insect pests, etc.?

(4) What are the water losses in present lateral irrigation ditches per unit of length with respect to degree of slope, soil type, ditch cross section, vegetation, and cross slope of the land?

Work Started

Three lateral ditches were selected for observation and weirs installed at different intervals for measuring flows. Four plots were selected on typical soils of the Aiken, Holland, and Sites series; the principal orchard soils of the Sierra Nevada Foothill belt.

An engineer, an agronomist, and a soils man were assigned to the work. The engineer installed weirs in the lateral ditches. The agronomist takes weir readings and makes required observations on the agronomic phases of the work. The soils man is carrying on the soil moisture and penetration studies. All soil moisture determinations are being made in a temporary laboratory in the SCS garage at Placerville.

The fundamental working plan which was drawn up is being and will be followed throughout the study. It is believed that the results will be of great value in determining appropriate control practices. The findings and consequent recommendations for the Placerville area will be applicalbe elsewhere in Region 10, particularly on similar orchard areas in the Sierra foothill section of Central California.

COMPLETE CONTROL PROGRAM

Much of the erosion control work in the California Projects, particularly on the bean lands of the state, is primarily mechanical. This is made necessary by the long dry season and the specialized agriculture. Through experience in design and construction of these control measures their cost is being constantly reduced.

Lost Soil

An example is a 117 acre bean field on the Aliso Creek Project area. This field comprises a small valley through the bottom of which run-off water was cutting a gully. Sheet erosion has removed nearly all the soil from 17 acres of land around the top edge of the field and has caused considerable losses of soil from both sides of the valley which have slopes of from 10 to 20 percent.

Removed from Cultivation

The control program called for removal of the badly eroded 17 acres from cultivation and the construction of Gradoni terraces on that land. These level terraces were put in with a grader. With a tumble bug checks were then thrown across the terraces at regular intervals to form a series of basins. All the water which falls on this land is held in the basins until it can soak into the ground. Trees have been planted in these basins.

Gully Stabilized

The gully, 2700 feet long, was stabilized with a series of 27 combination dams and terrace outlets and will serve as the outlet channel. These dams have a crest of only 1½ feet, making it possible for the farmer to use all the land between them, losing only a few feet around each dam. By making the structures all alike except for length, it was possible to use only one set of forms for the whole series. Bitumuls solution sprayed on the soft concrete made it unnecessary to keep the dams covered with wet sacking during the curing process. The Bitumuls is also of value in that it fills all the pores of the concrete surface.

The total cost of controlling erosion on this farm was not high. Any farmer with similar conditions can well afford to do the necessary work.

RODENTS REQUIRE CONTROL

- by -

Merle R. Gross - Agronomy Division

Terraces, structures, and plantings used in erosion control must be protected from possible damage by rodents. Rodent control operations are therefore being carried on on all projects.

Rodents may burrow and undermine and weaken mechanical control measures such as diversion ditches, terraces, and dams. These burrows are often dug through or under terrace and ditch banks. During a rain the water may enter these burrows, cut them larger and deeper and cause breaks that wash gullies down the slope. Concentration of water may then break through one terrace after another. Rodents have dug around and under dams thus permitting water to cut channels and render dams useless.

Rodents eat and girdle roots, bark trees, dig up seeds and eat leaves and stems of many plants.

Gophers

Gophers are injurious due to their burrowing and feeding habits. They live wholly underground in many-branched, horizontal tunnels which they are continually extending. One gopher may undermine as much as an acre of land. The tunnels are from 2 to 5 inches in diameter and from 4 to 14 inches below the surface.

The gophers feed on tubers, bulbs and other roots; on stems and leaves of plants, and on small fruits and grains. They cut or girdle the roots of trees and vines. Under favorable conditions they breed all year round and are often very numerous.

Poisoning and trapping are the methods used to control gophers. Poisoning is most effective when the ground is wet as the animals are active and their burrows easy to locate. The bait is cubed root vegetables, preferably sweet potatoes or carrots dusted with strychnine. The main runways are located with a special probe. Each system of runways is baited at two or more places using two pieces of bait at each probe opening. The opening is then covered. During the summer months poison grain is used with good results.

Trapping is much slower than poisoning and is used when probing is not practical, or in the final clearing of a badly infested piece of land. Two traps are placed in the main runway, one in each direction.

Squirrels

Ground squirrels burrow in much the same mannor as gophers although their tunnels are usually shorter and deeper. The burrows are used to live in and the feeding is done on the surface of the ground.

Food consists of seeds, grains, nuts, grasses, and other green herbage in large quantities. In fact it has been estimated that on the open range 200 squirrels will consume as much green forage as one steer or ten sheep.

Poisoning, fumigation with carbon disulfide, and trapping are the methods now being used for control. Food habits vary from place to place and also with the season. A variety of poisoned baits must therefore be used. Late winter or early spring control is desirable as one female killed then is equivalent to 6-8 squirrels later in the year after the breeding season is over.

Carbon disulfide fumigation is most effective when the soil is damp, but it can be carried on in dry seasons if the soil is not cracked or porous. The poison is applied by means of guns or Karbo-killers and by waste soaked in this highly inflamable liquid.

Steel traps have proved effective. The only cost is the labor involved in operating the traps.

Rabbits

Though not rodents, rabbits are closely related to them and have similar habits. On some areas they are doing a great deal of damage in eating off the newly planted trees. Black locust and elm have been damaged most severely.

Because of the great amount of brush and cacti on most of the project areas poisoned baits have not proved effective. The control work at present consists of placing tar paper screens around the young trees. The size of the screen varies with the kind of tree. For locust it is 18 inches high and 9 inches wide. The paper is rolled into a tube and fastened with paper clips.

Until an effective and inexpensive repellant is developed, it will be the practice to plant trees

only of such kind and in such locations as to minimize the amount of rabbit damage.

Wood Rats

Wood rats have done considerable damage on two of the projects in digging up planted seeds. Trapping has proved the most effective method of control.

Field Mice

Except on the Placerville Project no mice control operations have been necessary. On this area a few orchards were planted to cover crops, and it was necessary to protect the trees from being girdled. The method employed was to reduce the harbor available for field mice by raking the grass and weed growth from around each tree. Grain bait was then placed in small metal or roofing paper tubes on the raked ground. The tubes were used to prevent poisoning birds and other beneficial wildlife.

The rodent control work has had the cooperation of the Biological Survey, the California State Department of Agriculture, and the County Agricultural Agents. For complete and permanent control the landowners should carry on the work themselves between the visits of the regular control crews.

CHANNEL STRAIGHTENING INCREASES USABLE LAND

The straightening of 3,000 feet of drainage channel on the Aliso Creek Project area will provide enough land for 100 new orange trees and a two acre planting of persimmons. The owner of the land is paying for the pipe and wire which will be used in the construction of a revetment to keep run-off water in its new channel. The returns from the additional fruit trees will bring a large return to the farmer for his $500 investment in erosion control.